Perception of the Affordances of Everyday Objects by Human Infants

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Abstract

Prior research has demonstrated that young infants are able to perceive the affordance, or the potential for action, provided by the physical layout of their environment, including surfaces that support locomotion, those that afford falling, and those that afford collision versus passing though. Little, if any research, however has been conducted to determine whether infants can detect the potential for action provided by ordinary household objects. This study investigated the ability of 5.5-month-old human infants to discriminate the correct from the incorrect use of a common, familiar object. Sixteen infants were habituated to a video of a woman performing an everyday activity with a common object (brushing hair, eating, drinking, washing the face). The object was used correctly during habituation (e.g. brushing hair with a brush). Following habituation infants received four test trials showing the familiar activity, two depicting a novel object used correctly, and two depicting a novel object used incorrectly (e.g. brushing hair with a comb versus a glass). It was expected that if infants were sensitive to the affordances of these objects they would show greater visual recovery to the novel object that was used incorrectly than to the novel object that was used correctly. Results supported our prediction. Visual recovery to both novel object events was significant, and recovery to the incorrectly used object was significantly greater than to the correctly used object ($p < .05$). These results demonstrate that infants perceive the affordances of everyday objects. The findings are consistent with an invariant detection view of perceptual development.

Introduction

According to Gibson's ecological view of perceptual development, infants are active perceivers and can perceive the affordances, or potential for action, of the objects and surfaces in their environment (Adolph, Eppler, and Gibson, 1993; Gibson, 1969). Prior research has demonstrated that even very young infants perceive the affordances provided by the physical layout of surfaces in their environment, including those that support locomotion, those that afford falling, and those that afford collision versus passing though. Little, if any research, however, has been conducted to determine whether infants can detect the potential for action provided by ordinary household objects. Infants likely observe others using common objects (e.g., tools and utensils) to accomplish simple goals (e.g., grooming, washing, eating, and drinking). Is infant attention drawn to the critical features of the objects that support the actions? Do infants perceive the appropriate affordances of ordinary tools and utensils in the context of these actions? The present study investigated the ability of 5 1/2-month-old infants to discriminate the correct from the incorrect use of common, familiar objects.

Stimulus Events

Color video films were made of a woman performing repetitive, everyday activities with common objects. Four activities (brushing hair, eating, drinking, and washing the face) were filmed, each depicting the woman using two objects correctly to accomplish the goal (e.g., eating with a spoon or with a fork) and two objects incorrectly to accomplish the goal (e.g., eating with a washcloth or with a sponge; see Figure 1). There were 16 different events and each object was used correctly in one activity and incorrectly in another activity.

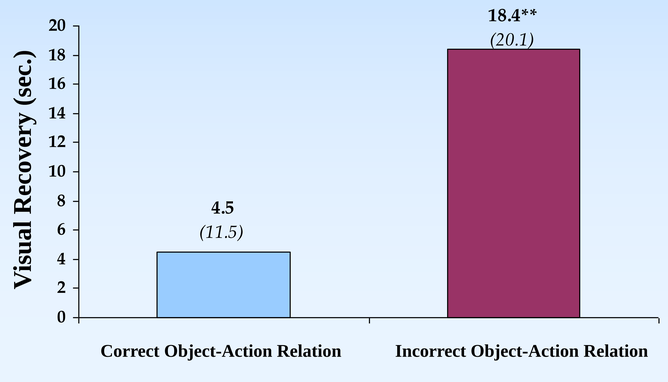
Procedure

Sixteen 5½ month-old infants were habituated in an infant-control procedure, to one of the video displays of the woman performing an everyday activity with a common object. During habituation, the object was used correctly (e.g., brushing her hair with a brush). Following habituation, infants received four test trials showing the woman engaged in the familiar activity with a novel object. Two trials depicted the novel object used correctly (e.g., brushing her hair with a comb), and two depicted the novel object used incorrectly (e.g., brushing her hair with a glass). Infants were randomly assigned to one of the four activity conditions, with half receiving one of the correct objects and half receiving the other correct object for habituation, (e.g., brushing hair with brush versus comb). Visual recovery to the novel object served as the primary dependent variable. It was expected that if infants were sensitive to the affordances of these objects, they would show greater visual recovery to the new object that was used incorrectly than to the new object that was used correctly.

Figure 1

Figure 2

Mean Visual Recovery (and SD) to a Novel Object in the context of Action for trials where the Object was used Correctly vs Incorrectly



*p <.05

**p < .01

Results

Results supported our hypothesis and demonstrated that infants showed significant visual recovery on the test trials where the novel objects were used incorrectly ($t(15) = 3.66$, $p=.002$) and no significant visual recovery on the test trials where the novel objects were used correctly ($t(15)= 1.6$, $p >.1$, see Figure 2). Further, infant visual recovery on the trials showing the incorrectly used novel objects was significantly greater than their visual recovery on the trials showing the correctly used objects, according to a matched sample t-test ($t(15)= 3.68$, $p= .001$). At the individual subject level, 14 of the 16 infants showed positive visual recovery scores to the incorrectly used novel object events. This is significant according to a binomial test ($p = .002$). In contrast, only 8 of the 16 infants showed positive visual recovery scores to the correctly used novel object events ($p >.1$).

Conclusions

These findings support the conclusion that by 5½ months of age, infants perceive the affordances for action of everyday objects. Infants discriminated between the correct and incorrect use of common objects in the context of everyday actions. These findings are consistent with an invariant detection view of perceptual development. Infants likely attend to the critical features of everyday objects and detect invariant relations between these features and the nature of the actions performed with the objects.

References

Adolph, K.E., Eppler, M.A., & Gibson, E.J. (1993). Development of perception of affordances. In C. Rovee-Collier & L.P. Lipsitt (Eds.). *Advances in Infancy Research.* (*Vol. 8*, pp.51-98). Norwood, NJ: Ablex.

Gibson, E.J. (1969). *Principles of perceptual learning and development*. New York: Appleton-Century Crofts.

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